Greenflame 40kW External

Installation, Operation and Servicing Instructions

PLEASE NOTE:

This product MUST be commissioned by a T R Engineering Ltd approved engineer.

INSTALLER
Have you been trained by T R Engineering Ltd to commission this appliance?
If you intend to commission and do not have a T R Engineering Ltd Cert No. Call now to arrange training on 0114 257 2300

Please read these instructions carefully before installing and operating this appliance.

TO BE RETAINED BY THE HOUSEHOLDER

Contents

1. Introduction 3
2. Warnings and Guarantee/Warranty Conditions 3-5
    - 2.1 Safety instructions 3
    - 2.2 Operating Warnings 3
    - 2.3 Guarantee/Warranty Information 4
        - 2.3.1 Limitations 4
        - 2.3.2 Exclusions 4
    - 2.4 Clean Air Act 5
    - 2.5 Customer Handover 5
3. After Sales Service Information 5-6
    - 3.1 How to Report a Fault 5
    - 3.2 Technical Assistance 5
4. Pre-Installation Considerations 6-8
    - 4.1 Pellets 6
    - 4.2 Considerations for Installation 6
    - 4.3 Operating Area 6
    - 4.4 Connection of the Flue 7
    - 4.5 How the Greenflame Overcomes Issues caused by Draught Defects 7
    - 4.6 Plumbing Connections 8
5. Installation and Assembly 8-14
    - 5.1 Unpacking 8
    - 5.2 Preparing the Base 8
    - 5.3 Electrical Connections 9
    - 5.4 Boiler Control Panel Schematic 10
    - 5.5 Auger Set-Up (Optional) 11
    - 5.6 Vacuum Set-Up (Optional) 12-13
        - 5.6.1 Description 12
        - 5.6.2 Installation 12
        - 5.6.3 Controller Functions 12
        - 5.6.4 System Menu 12
        - 5.6.5 Technical Data 13
        - 5.6.6 Assembly 13
    - 5.7 Water Connections 13
6. Control System 14-15
    - 6.1 Error Codes 14
7. Boiler Operation & Maintenance 15-16
    - 7.1 Turning ON and OFF the Boiler 15
    - 7.2 Emptying the Ash Pan 15
    - 7.3 Filling the Hopper with Fuel 15
    - 7.4 First Fire Up 15
8. Technical Data 16
9. Maintenance Schedule 17
10. Service Log 19

1. Introduction

Dear Customer,
We wish to thank you for choosing this Greenflame wood pellet boiler product from T R Engineering Ltd. **In order to get the best performance from your appliance we recommend that you read this booklet carefully before lighting the appliance for the first time.**
While thanking you again, may we remind you that the appliance **MUST NOT** be used by children and that they must always be kept at a safe distance from it.

Revisions to the publication
In order to improve the product, to keep this publication up to date the manufacturer reserves the right to make notifications without any advanced notice. Any reproduction, even in part, of this manual without the consent of T R Engineering Ltd is prohibited.

Care of the manual and how to consult it

- Take good care of this manual and keep it in a place which can easily and quickly be reached.
- If this manual should be lost or destroyed, or if it is in poor condition, ask for a copy from your retailer or directly from the manufacturer, providing product identification data.
- Information which is essential or that requires special attention is shown in bold text.
- Italic is used to call your attention to other paragraphs in the manual or for any additional clarifications.

	ATTENTION This warning sign indicates that the message to which it refers should be carefully read and understood, because failure to comply with what these notices say can cause serious damage to the boiler and put the user's safety at risk.
	INFORMATION This symbol is used to highlight information which is important for proper boiler operation. Failure to comply with these provisions will compromise use of the boiler and its operation will not be satisfactory.
	OPERATING SEQUENCES Indicates a sequence of buttons to be pushed to access menus or make adjustments.
	MANUAL Indicates that you should carefully read this manual or the related instructions.

T R Engineering Ltd

T R Engineering Ltd operates a policy of continuous development and improvement of our products and welcomes any feedback from our customers. Please forward your comments to:

T R Engineering Ltd
Unit 7, Newton Chambers Way
Thorncliffe Industrial Estate
Chapeltown
Sheffield
S35 2PH

Tel: 0114 257 2300
Fax: 0114 257 1419
E-mail: info@trianco.co.uk
Web: www.trianco.co.uk

2. Warnings and Guarantee/Warranty Conditions

2.1 Safety Instructions

Installation of the boiler, making electrical connections, checking its operation and maintenance are all tasks which should be carried out by qualified and authorised personnel.

Install the boiler in accordance with the regulations in force in your local area, region and country.

For the correct use of the appliance and to prevent accidents, the instructions given in this booklet must always be followed.

Use, adjustment and programming must be carried out by adults. Errors or incorrect settings may cause hazardous conditions and/or poor operation.

Before beginning any operation, the user, or whoever is preparing to operate on the appliance, must have read and understood the entire contents of this instruction booklet.

All responsibility for improper use taken entirely by the user and such use relieves T R Engineering Ltd of any civil or criminal responsibility.

Most of the surfaces of the appliance are extremely hot (the boiler door, the handle, smoke discharge pipes, etc.). Avoid coming into contact with these parts, without adequate protective clothing or suitable implements which keep the hands cool.

Carefully explain this hazard to elderly people, disabled people and particularly to all children, keeping them away from the appliance while it is running.

Under no circumstances should the appliance be run with the door open.

Do not touch the appliance with wet hands, in view of the fact that it is an electrical appliance.

Before carrying out any cleaning or maintenance operation, make sure in advance that the appliance is isolated from the mains electricity supply, by removing the mains isolator fuse.

The appliance must be connected to an electrical system which is equipped with an earth conductor, as laid down in directive 73/23 EEC and 93/98 EEC.

The fuse must be of adequate rated capacity for the stated electrical power of the appliance.

Incorrect installation or faulty maintenance (not conforming to the requirements set out in this booklet) can cause harm to people, animals or property. In such cases T R Engineering Ltd is absolved from any civil or criminal responsibility.

Adhesive sealants and paints used in manufacture of the product are cured and present no known hazards when used in the manner for which they were intended. The appliance contains no asbestos.

2.2 Operating Warnings

Shut the appliance down in the event of a breakdown or bad running.

Pellets must not be fed manually into the burner.

Accumulated un-burnt pellets in the burner after repeated failed ignitions must be removed before re-lighting.

Do not wash the inside of the heat exchanger with water.

Do not wash the appliance with water. The water could get inside the unit and damage the electrical insulation and cause electric shocks.

Do not put any fuel, other than wood pellets, in the hopper.

Install the appliance in a location which is suitable for fire-fighting and equipped with all services such as air and electricity supply and provision for discharging combustion gases.

If there is a fire in the flue pipe, extinguish the appliance, disconnect it from the power supply and never open the door. Then contact the competent authorities.

If the appliance is in storage, it should be in a place that is free of damp, and it should not be exposed to extremes of temperature.

It is inadvisable to base the appliance directly on a floor (if located indoors), and if the floor is made of flammable material, it must be suitably insulated.

Do not light the appliance with flammable materials if the ignition system breaks down.

Information

In case of any problems, get in touch with your dealer, or a qualified engineer authorised by T R Engineering Ltd and if a repair is necessary, insist on the use of original spare parts.

Use only fuel recommended by T R Engineering Ltd (ENplus-A1) may be used with this appliance.

Periodically check and clean the smoke outlet ducts (connection to the flue pipe).

Accumulated un-burnt pellets in the burner after repeated failed ignitions must be removed before lighting.

Always keep the cover of the fuel hopper closed.

Keep this instruction manual safe because it must stay with the appliance throughout its working life. If the appliance is sold or transferred to another user, always make sure that the booklet goes with the product.

If it gets lost, ask T R Engineering Ltd or your authorised dealer for another copy.

2.3 Guarantee/Warranty Information

T R Engineering Ltd offers the following warranties on this appliance:

Leaks in the heat exchanger – 5 years

Faulty electrical components (motors, fan, controller) – 1 year

Pump, ignition element – 1 year

From the date of first ignition of the appliance as proved by a valid commissioning report which gives the name of the installer/commissioning engineer and the date on which the commissioning took place. The guarantee is conditional on the commissioning report being filled in and returned to the installed and commissioned by an approved T R Engineering Ltd installer according to the detailed instructions given in the instruction booklet supplied with the product.
The term 'guarantee' is to be understood to denote the free of charge replacement or repair of **parts only, recognised to have been defective at the start by reason of manufacturing defects.**

2.3.1 Limitations

The above guarantee does not cover parts subject to normal wear such as gaskets, fibre board on doors and any parts which can be removed from the firebox such as burner pot, baffles and ash box. The replacement will be guaranteed for the remainder of the guarantee period starting from the date of commissioning of the product.

2.3.2 Exclusions

The warranty excludes all ancillary products associated with the system (e.g. flue pipes, external circulation pumps, bulk hopper and augers, plumbing and electrical system). The warranty does not cover third party damage to the product or damage caused by the plumbing (an example would be an inappropriately sized expansion vessel) or electrical system. Warranty does not cover issues arising from pellets that do not conform to ENplus-A1.
Recommendations advised to the customer to be carried out during commissioning must be completed and advised to your local dealer in order to validate the warranty.
The requirement for the flue installation, particularly in relation to draught, is the responsibility of the system owner. Compliance with Local Building Regulations must be adhered to. The warranty does not cover misuse of the product or sabotage.
Any consequential damage caused by the failure of a component on this product is not covered.
T R Engineering Ltd refuses to accept the responsibility for any damage which may be caused, directly or indirectly, by persons, animals or things in consequence of the failure to observe all prescriptions laid down in the instruction booklet, especially those concerning warnings on the subject of installation, use and maintenance of the appliance.
Damage caused by transport and/or handling is excluded from the guarantee.
The guarantee will be invalidated in the event of damage caused by tampering with the appliance, atmospheric agents, natural disasters, electrical discharges, fire, defects in the electrical system and caused by lack of, or incorrect, maintenance in terms of the manufacturer's instructions.

Claims under the Guarantee

The request for action under the guarantee must be addressed to the dealer/retailer, who will forward the claim to T R Engineering Ltd's technical assistance service. **T R ENGINEERING LTD DECLARES THAT THE APPLIANCE WHICH YOU HAVE PURCHASED COMPLIES WITH THE EEC DIRECTIVE 2004/108 EC AND 2006/95/EEC AND SUCCESSIVE AMENDMENTS.**

T R Engineering Ltd refuses to accept any responsibility in the event that the appliance or any other accessory has been improperly used or modified without authorisation. For all replacement of parts, only original T R Engineering Ltd spare parts must be used.

2.4 Clean Air Act 1993

Under the Clean Air Act 1993 local authorities may declare the whole or part of the district of the authority to be a smoke control area. It is an offence to emit smoke from a chimney of a building from a furnace or from any fixed boiler if located in a designated smoke control area. It is also an offence to acquire an "unauthorised fuel" for use within a smoke control area unless it is used in an "exempt" appliance ("exempted" from the controls which generally apply in the smoke control area).

The secretary of State for Environment, Food and Rural Affairs as powers under the Act to authorise smokeless fuels or exempt appliances for use in smoke control areas in England. In Scotland and Wales this power rests with ministers in the devolved administrations for those countries. Separate legislation, the Clean Air (Northern Ireland) Order 1981, applies in Northern Ireland. Therefore it is a requirement that fuels burnt or obtained for use in smoke control areas have been "authorised" in regulations and that appliances used to burn solid fuel in those areas (other than "authorised" fuels) have been exempted by an Order made and signed by the Secretary of State or minister in the devolved administrations.

Further information on the requirements of the Clean Air Act 1993 can be found here: http://smokecontrol.defra.gov.uk/

Your local authority is responsible for implementing the Clean Air Act 1993 including designation and supervision.

2.5 Customer Handover

After every commission the customer **MUST** be provided with training by the commissioning engineer. The following is a list of times which should be covered during the product induction with the customer:

- Provide a general overview of the product and identify the main components and their function.
- Illustrate how to turn on and off the appliance and adjust water temperature through the user menu.
- Demonstrate where and how to fill the appliance with fuel and advise of the correct quality of fuel to be used.
- Demonstrate how to clean down the combustion chamber by removing and replacing the baffles, emptying the ash container in the main combustion chamber and lower ash chamber.
- Explain how to remove the burner grate and clear the air holes to ensure good combustion.
- Explain the various error codes that may appear and provide instruction on how to manage and clear messages. Provide warnings on which error codes are system critical codes and should not be reset by the customer.
- The customer must be warned of the safety implications when handling hot ash and that heat proof gloves should be used.

The product warranty must be explained to the customer and they shall sign the commissioning card confirming that they have received instructions on how to operate the appliance, understand the risks when handling hot ash and agree to the product warranty.

The warranty card and commissioning report shall be returned to T R Engineering Ltd by fax, email or post within 30 days from the commissioning date.

3. After Sales Service Information

A qualified field service engineer is available to attend a breakdown occurring during the boiler's guarantee period.
The boiler must be made available for attendance during normal working hours, Monday to Friday.

3.1 How to Report a Fault

Step 1
Contact your installation or service engineer, who should assess the unit and works carried out on the appliance prior to requesting the attendance of an engineer from T R Engineering Ltd.

Step 2
Please note that upon attendance by T R Engineering Ltd engineer, a charge will be made where:

- The engineer finds no fault with the boiler.
- The cause of the breakdown is due to parts of the system not manufactured or supplied by T R Engineering Ltd.
- The boiler has not been installed in accordance with these instructions.
- The boiler has not been commissioned by a qualified engineer.
- The boiler has not been serviced annually since installation.
- The breakdown occurs outside the guarantee period.
- The appliance has not been maintained correctly.
- The breakdown occurs as a result of work on the appliance by an unauthorised third-party.

Important:
Invoices for attendance and repair work by any third-party will not be accepted unless authorised in advance by T R Engineering Ltd.

3.2 Technical Assistance

A team of trained technical advisors are available to discuss any problem with the appliance. In many cases, the problem may be solved over the telephone, eliminating the need for an engineer's visit.
Before making contact, please have the following information ready:

- The appliance serial number or your unique customer identification number (issued upon registration of the appliance with T R Engineering Ltd.
- A description of the fault and any unusual behaviour by the boiler before the failure occurred.

- The installation and commissioning dates and the details of any annual services.

Appliance Serial No: _____
Cust. ID No: _____
Installation Date: ___/___/___
Commissioning Date: ___/___/___

Service Centre and Technical Support
Tel: 0114 257 2300 Fax: 0114 257 1419

Hours of Business
Monday – Thursday: 8:30am – 17:00pm
Friday: 8:30am – 14:30pm

4. Pre-Installation Considerations

4.1 Pellets

Wood pellets are manufactured by hot-extruding compressed sawdust which is produced during the working of natural dried wood. The compactness of the material comes from lignin which is contained in the wood itself and allows the production of pellets without the use of glues or binders.
The market offers different types of pellet with characteristics which vary depending on what mixture of woods is used. The diameter varies between 6mm and 8mm, with a standard length in the range 5mm to 30mm. Good quality pellets have a density which varies between 600kg/m^3 and 750kg/m^3, with a moisture content which varies from 5% to 8% by weight.

Besides being ecological fuel (exploiting timber residues to the maximum and achieving cleaner combustion than is possible with fossil fuel), pellets also have technical advantages. While good quality timber has a calorific power of 4.4kW/kg (with 15% moisture, therefore after about 18 months seasoning), the equivalent figure for pellets is 4.9kW/kg.

To ensure good combustion, the pellets must be stored in an area that is free of humidity and protected from dirt. The pellets are usually supplied in 10kg bags, so storing them is very convenient. Good quality pellets ensure good combustion, thus lowering the emission of harmful agents into the atmosphere.

The poorer the quality of fuel, the more frequently intervention be necessary for cleaning the internal parts, such as the grate and the combustion chamber.

The main certifications of quality for pellets in the European market are ENplus-A1 these ensure respect of:
- ✓ **Calorific Power**: 4.9kW/kg
- ✓ **Water Content**: max 10% of weight
- ✓ **Percentage of Ashes**: max 0.5% by weight
- ✓ **Diameter**: 6mm
- ✓ **Length**: max 30mm
- ✓ **Contents**: 100% untreated wood, with no added bonding substances (bark percentage 5% max)
- ✓ **Packaging**: in sacks made from ecologically compatible or biologically decomposing material.

T R Engineering Ltd recommends using certified fuel in its appliances to ENplus-A1. The use of fuel of inferior quality or not conforming to the specification given above compromises the running of your appliance and can therefore lead to the termination of the guarantee and of the manufacturer's responsibility for the product.
T R Engineering Ltd domestic pellet appliances run exclusively on pellets with a diameter of 6mm. It is recommended that the brand of pellets used during commissioning are used during normal operation. If you change your pellet supplier or brand, re-calibration may be necessary and a call-out charge will apply.

The Greenflame 40kW has been recommended as suitable for use in smoke control areas when burning ENplus-A1 wood pellets.

4.2 Considerations for Installation

IMPORTANT!
Installation and assembly of the appliance must be carried out by qualified personnel.
The appliance must be installed in a suitable position to allow the normal operations of opening and ordinary maintenance. The site must be:
- Capable of providing the environmental conditions for operation.
- Equipped with power supply 230V 50Hz (EN73-23).
- Capable of taking an adequate system for smoke discharge.
- Provided with external ventilation (if located indoors).
- Provided with an earth connection complying with CEI 64-8.

The appliance must be connected to a flue pipe or an internal or external vertical duct conforming to current standards UNI7129 – 7131 9615.
The boiler must be positioned in such a way that the power isolation fuse is accessible.

IMPORTANT!
The boiler must be connected to a flue pipe or a vertical duct which can discharge the fumes at the highest point of the building.

The fumes are however derived from the combustion of wood products, and if they come into contact with or close to walls, they can cause smoke staining. Also take care because the fumes are very hot and almost invisible, and can cause burns on contact.

4.3 Operating Area

For proper functioning, the appliance should be positioned in allocation where it is able to take in the air necessary for combustion of the pellets (about 40m^3 must be available), as laid down in the standard governing the installation and in accordance with local national standards. All louvers on the external casing of the boiler must be un-obstructed at all times as these allow air for combustion and for cooling to enter the appliance enclosure. Heavy snowfall can also obstruct the air in-take louvers and cause the appliance to not burn clean. Smoke emanating from the flue is a symptom of this. Snow must be cleared from around the appliance at the earliest opportunity.

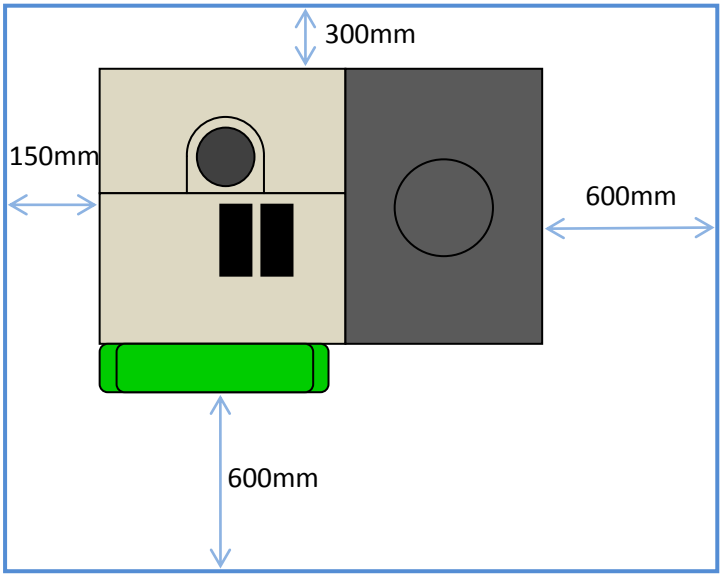
Where the appliance is to be installed indoors it is not permissible to install the appliance where another

heating appliance is installed (fireplace, stove, etc.) which does not have its own independent air intake.
Locating the appliance in a room with an explosive atmosphere, e.g. workshop or tool shed, is prohibited.
The floor of the room where the appliance is to be installed must be strong enough to take its weight.
If the walls are not flammable, position the appliance with a clearance to the rear of at least 450mm.
For flammable walls, keep a minimum distance of 450mm at the rear, 300mm on the sides and 1500mm at the front.

If the flooring is made of wood, provide a floor protection surface in compliance with current national standards.

Service Clearances

The minimum service clearances around the appliance are as follows:
Rear – 300mm Nominal
Ends – 150mm Boiler End/600mm Hopper End
Front – 600mm
Concrete plinth should extend 150mm past front and ends.



4.4 Connection of the Flue

The proper draught conditions in the flue are critical for the efficient working of wood pellet boilers. The flue can exit the boiler house/garage through the roof or through the wall by using a bend on the flue. The combustion chamber works in negative pressure. The smoke duct for the discharge of fumes will also be under negative pressure when connected to an efficient flue pipe as directed.
All sections of the flue must be capable of inspection and removable to enable periodic internal cleaning.
Position the appliance bearing in mind all instructions and considerations above.

IMPORTANT!
THE FLUE IS AN INTEGRAL AND CRITICAL COMPONENT IN ANY SUCCESSFUL BIOMASS BOILER INSTALALTION. IN ORDER FOR YOUR BOILER TO OPERATE CORRECTLY, EFFICIENTLY AND SAFELY IT HAS TO BE CONNECTED TO A FLUE SYSTEM WHICH IS SUITABLE, CORRECTLY DESIGNED AND INSTALLED.

INCORRECT FLUE CONNECTIONS CAN LEAD TO CONDITIONS BEING CREATED WHICH CAN BE UNSAFE, DAMAGING TO YOUR BOILER AND INVALIDATE THE WARRANTY.

- Check for adequate ventilation. This must be clear at ALL times. You must take the customer aware of the needs to avoid any obstruction of the air inlet facility. If an internal boiler is asked to operate without sufficient ventilation for fresh air it will lead to potentially dangerous and damaging consequences.
- Ensure that the flue installation meets all requirements in terms of the use of bends, tees and restrictions.
- Every flue **MUST** include draught stabilisation, explosion relief, condensate collection and the correct protective cowl or terminal as required.
- Commissioning – The flue draught must be checked under both full load and part load conditions to ensure that there is the correct amount of draw in both cases. It is essential that the correct draw is achieved for both specified flue gas temperatures and that a draught stabiliser is used to avoid over drawing of the flue. Correct setting of the draught stabiliser is critical.
- All flues must be correctly insulated. A poorly insulated flue can lead to issues during operation of the boiler which may be damaging.
- Flue termination must be in accordance with building regulations and pay attention to pressure zones which may be induced by the building and surrounding topography.

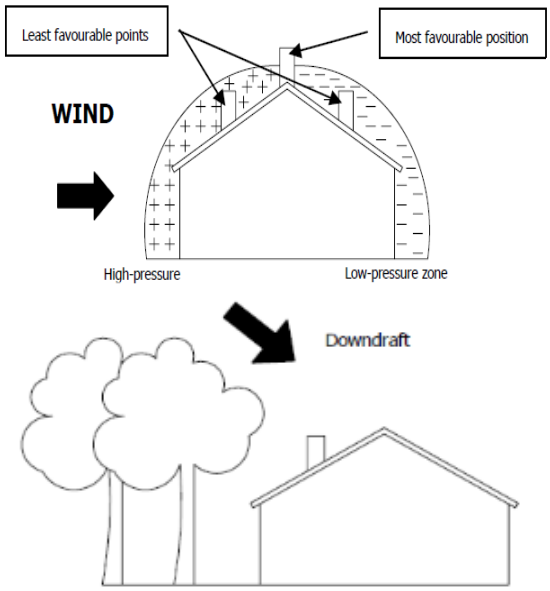
IMPORTANT!
All 90° changes of direction in the flue pipe must be either removable or capable of inspection. For locating the boiler against a wall ensure adequate flue support using approved wall brackets.

THE FLUE PIPE RUN MUST NOT INCLUDE MORE THAN 2-3 METRES OF HORIZONTAL PIPE AND MORE THAN THREE 90° ELBOWS (INCLUDING T's). IT IS ALSO ADVISABLE NOT TO EXCEED 8 METRES IN LENGTH WITH THE PIPE DIAMETER OF 100mm.

THE WEIGHT OF THE FLUE SHOULD NOT BEAR DOWN ON THE BOILER. THE SECTION OF FLUE JOINING THE BOILER MUST BE REMOVABLE SO AS TO REMOVE THE TOP OF THE BOILER FOR CLEANING THE SECONDARY HEAT EXCHANGER TUBES. FAILURE TO DO SO WILL INVALIDATE THE WARRANTY.

4.5 How the Greenflame Overcomes Issues Caused by Draught Defects in the Flue

Of all the weather and geographical conditions which affect the operation of a flue pipe (rain, fog, snow, exposure to sunlight, direction of facing), the **wind** is unquestionably the most decisive. In fact, along with thermal depression caused by the difference in temperature inside and outside of the chimney, there is another type of depression or over-pressure: dynamic pressure caused by the wind. An up-draught always increases depression and hence draught. A crosswind increases depression provided the cowl has been installed properly. A downdraught always decreases depression, at times inverting it.



Besides the direction and force of the wind, the position of the flue and cowl with respect to the roof of the building and surrounding landscape is important.
The Greenflame air flow regulation system is equipped to deal with the conditions referenced above by regulating the air flow through the combustion chamber. An air flow sensor is mounted on the air in-take duct and measures the volume of air drawn through the burner pot by the exhaust fan. If down draught conditions are present and air flow increases, the exhaust fan increases speed to maintain the required air flow. The opposite reaction occurs in up draught conditions.

IMPORTANT!
In areas of extreme weather, especially wind, additional measures may need to be provided for, in consultation with T R Engineering Ltd.

4.6 Plumbing Connections

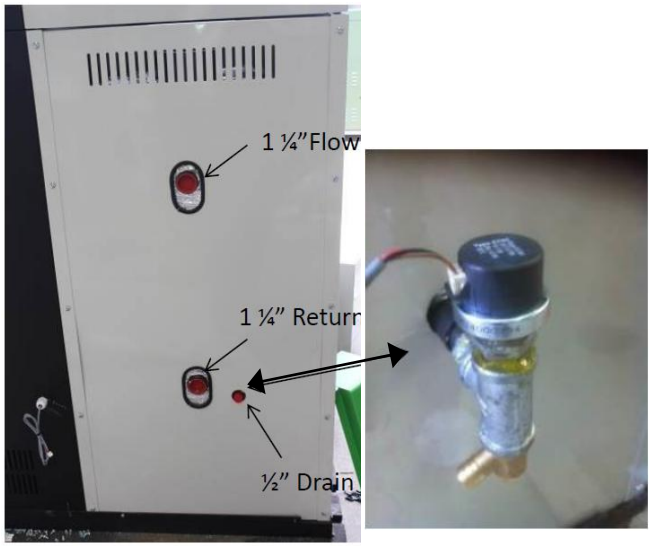
IMPORTANT!
The connection of the boiler to the plumbing system must be carried out ONLY by specialised personnel who are capable of carrying out installation properly, in compliance with current standards in the country of installation.

If the installation of the boiler will involve interaction with another, pre-existing system complete with heating equipment (gas boiler, methane boiler, fuel oil boiler, etc), it is even more advisable to call in qualified personnel, who subsequently will be responsible for conformity of the system with current applicable law.

T R Engineering Ltd will not be held responsible for damage to persons or things in the event of failed or incorrect operation if the aforementioned warnings are not complied with.

For connection of the plumbing system to the appliance, the user should refer to Chapter 5, INSTALLATION AND ASSEMBLY specifically, paragraph 5.5 WATER CONNECTIONS.

It is recommended that a suitable anti-freeze solution is added to the heating system to prevent the freezing of water within the boiler in case of a power outage. The boiler has an anti-freeze function which activates the pump in the event of the temperature in the boiler dropping below 5°C.



5. Installation and Assembly

5.1 Unpacking

The Greenflame 40kW pellet boiler will come packaged on a single pallet. The flue will be packaged separately.
The materials which make up the packaging are therefore the responsibility of the final user, in compliance with local regulations. Do not store the boiler without its packaging. Remove the nylon strapping, cardboard packaging and bubble wrap and recycle in the appropriate manner.
When unpacking the boiler use the checklist below to ensure that all the required components to complete the kit have been supplied. In the unlikely event of an omission you must notify the manufacturer within 48 hours of delivery. The manufacturer reserves the right to charge for items deemed lost after 48 hours.

Unpacking List

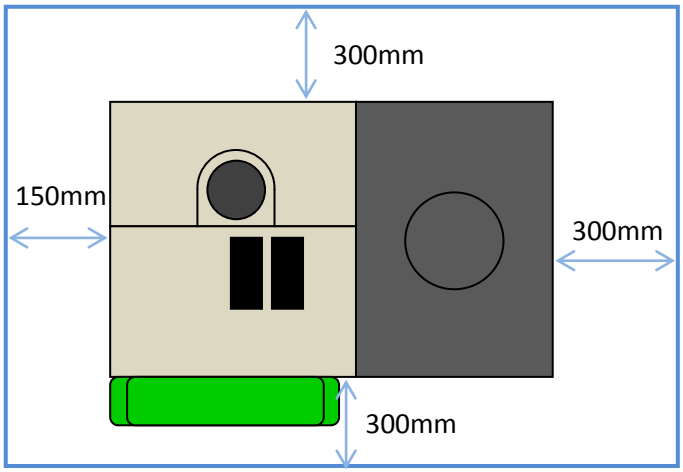
Item	Location	Received YES/NO
User Manual Pack	Combustion Chamber	
Water Pressure Sensor Assembly	Supplied in separate packaging	

*The user manual pack includes a user manual, quick step user instructions, commissioning report, key lockable doors and heat proof gloves.

5.2 Preparing the Base

Careful planning at an early stage will greatly help the installation process and make sure that all the required clearances are adhered to for servicing and that any potential issues with the routing of the flue can be resolved.
The Greenflame pellet boiler should be positioned on a concrete plinth at least 50mm high and should project a minimum of 300mm beyond the sides and the front of the appliance. The plinth must be capable of supporting the weight of the appliance when full with fuel and the plumbing system has been filled with water.

Refer to service and access clearance around the appliance on Page 7.



5.3 Electrical Connections

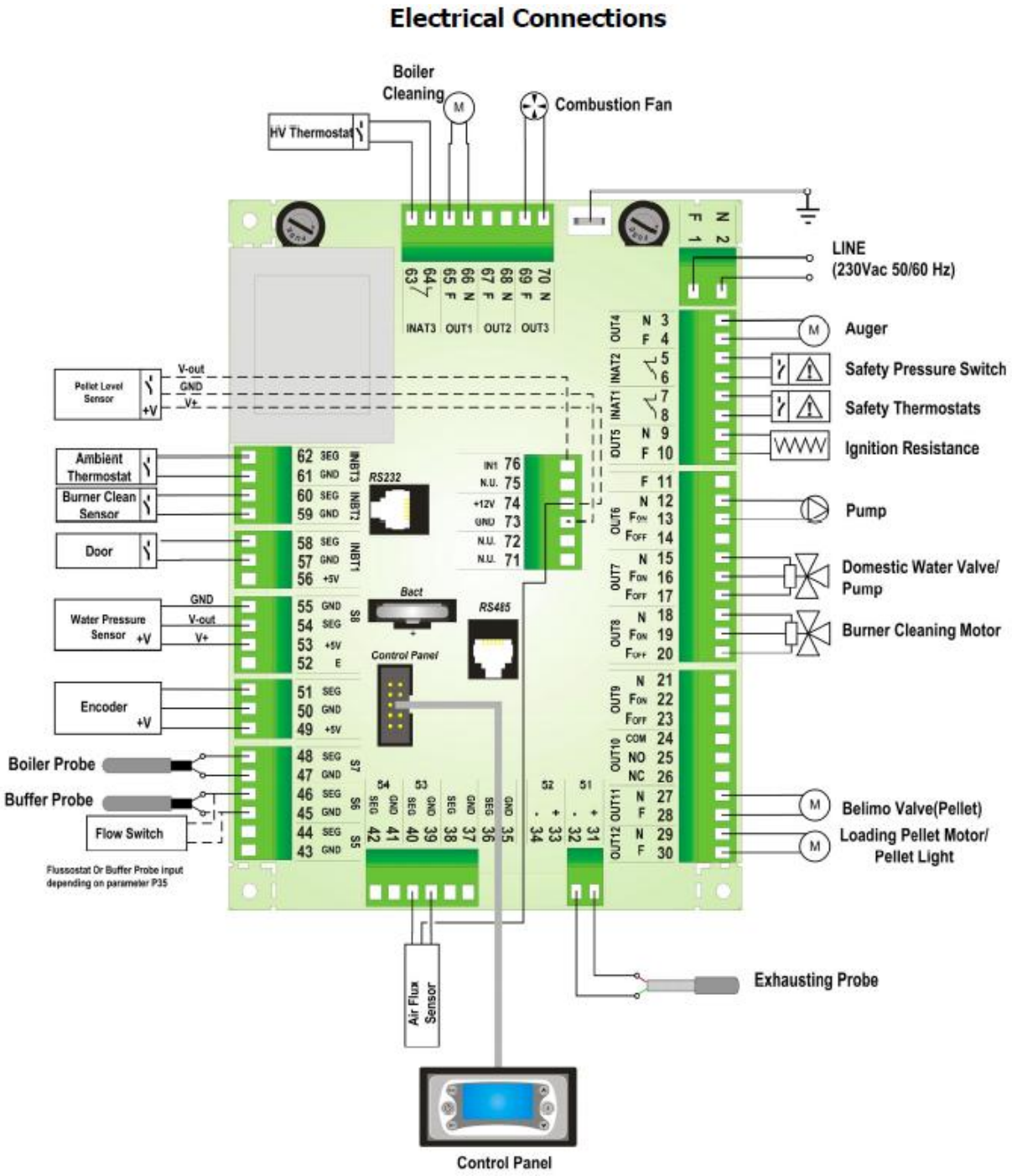
Electrical installations should only be carried out by suitably qualified and certified electricians. If in doubt on any issue relating to the electrical connections on the appliance contact T R Engineering Ltd Technical Support or your Local Dealer for guidance before carrying out any connections.

The T R Engineering Ltd must be supplied with a 230V 50Hz electrical supply via a two pole isolation switch rated for Overvoltage Category III and protected with a 6A circuit breaker. Also, the unit shall have a 30mA RCD installed into the mains supply. It is recommended that a power isolation switch is located adjacent to the boiler to isolate the power during servicing and maintenance but also of the reach of children and to prevent accidental turning off of the mains power.

Brown – Switched Live
Black – Permanent Live
Blue – Neutral
Green/Yellow - Earth

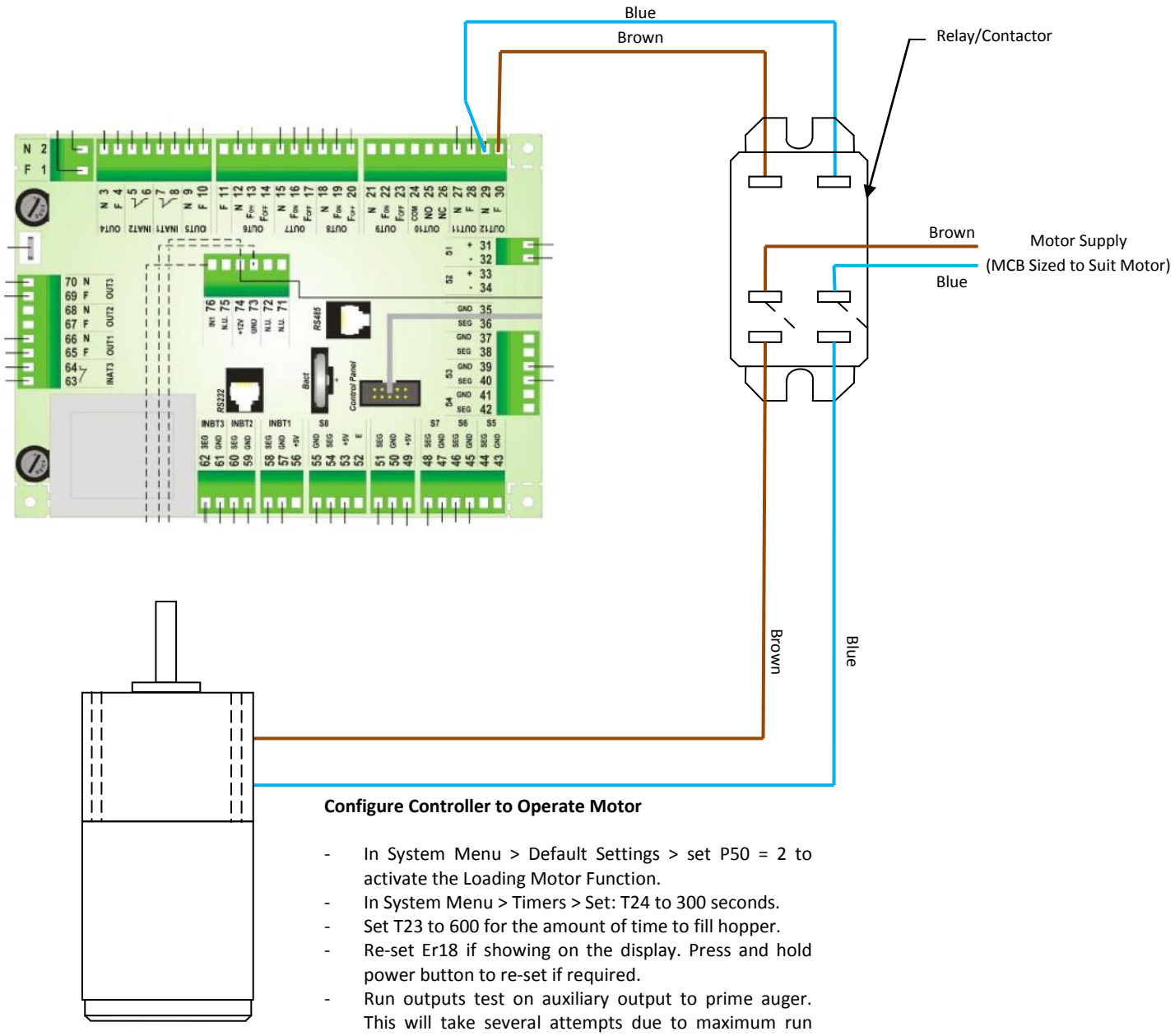
Only authorised T R Engineering Ltd personnel may open the control panel on the boiler. Any interference with the wiring with the wiring in the control panel will invalidate the warranty. The boiler and complete plumbing system must be adequately earthed and bonded in accordance with Local Building Regulations and Bye-Laws.

5.4 Boiler Control Panel Schematic



Only authorised T R Engineering personnel may open the control board. Any tampering with the PCB will immediately invalidate the warranty.

5.5 Auger Set-Up (Optional)



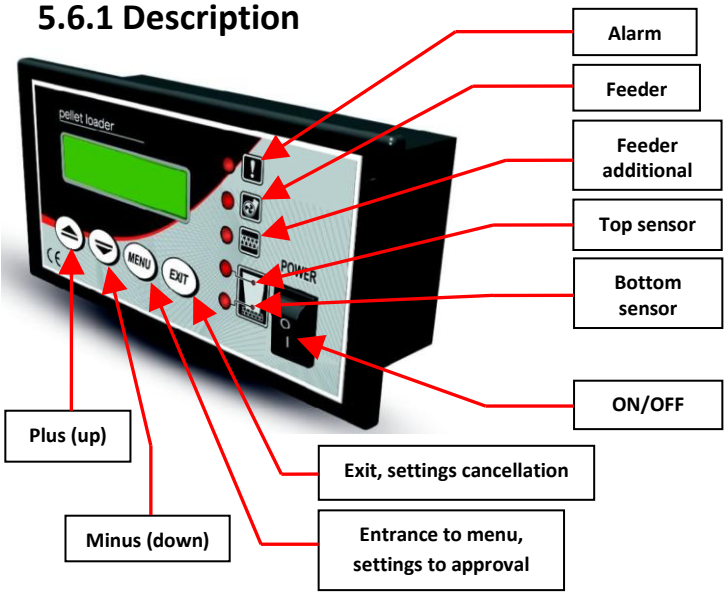
Configure Controller to Operate Motor

- In System Menu > Default Settings > set P50 = 2 to activate the Loading Motor Function.
- In System Menu > Timers > Set: T24 to 300 seconds.
- Set T23 to 600 for the amount of time to fill hopper.
- Re-set Er18 if showing on the display. Press and hold power button to re-set if required.
- Run outputs test on auxiliary output to prime auger. This will take several attempts due to maximum run time of 90 seconds per test. (Greenflame 25 wait 30 seconds for Belimo valve to open).
- Alternatively connect auger to temporary power supply and run until pellet appears at auger outlet.

Please ensure you check the grub screw is correctly fitted between the auger screw and motor!

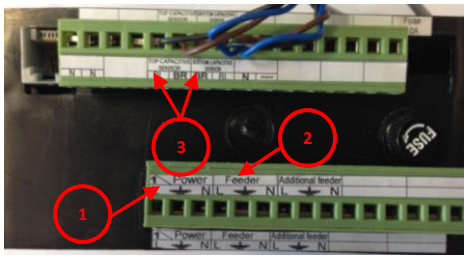
5.6 Vacuum System Set-Up (Optional)

5.6.1 Description



5.6.2 Installation

1. Remove 2 pin plug from power lead and connect t the power connections of the controller. Supply must come from a 13A switched fused spur.



2. Connect vacuum motor cable to feeder connections.
3. Using the sensor bracket and back nuts fit the low sensor 200m above the boiler hopper sensor and the high sensor should be approximately ¾ up the hopper (high and low sensors can be identified from the controller connections).

4. Fit vacuum pipe supplied with the unit to the motor connection on the back of the unit.

5.6.3 Controller Functions

Main Page

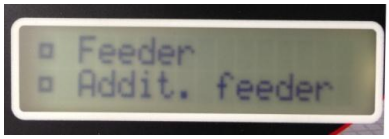
The main page is shown in the LCD display during normal operation with the following data displayed on it.

- Current time
- Feeder current (mA)
- Icon "(" (if the night mode is active)

By pressing the MENU button the sub-menu is entered or the selected option is activated. Press the EXIT button to exit the menu or cancel the setting.

Manual Operation

The controller is equipped with the manual operation mode for user's convenience. When using that function, each is turned on/off independently from the others.
By pressing the MENU button of the selected unit (feeder, additional feeder or alarm) is activated and stays on until the MENU button is pressed again.



Clock

The user may define the current time by setting the clock. Clock setting is necessary for proper operation.

Day from...

This function is used to define the time when the controller will switch to the day mode.

Night from...

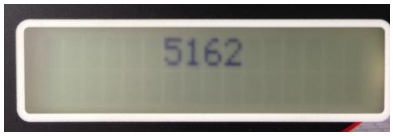
This function is used to define the time when the controller will switch to the night mode. The controller will start the main hopper filling process half an hour before switching to the night mode.

Language

This function is used to select the language version of the controller menu.

6.7.4 System Menu

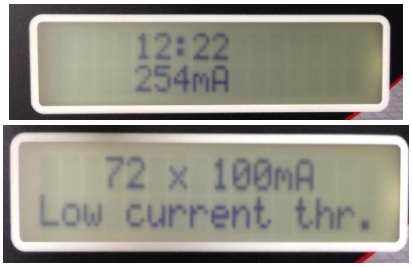
To access the system menu enter the password 5162.



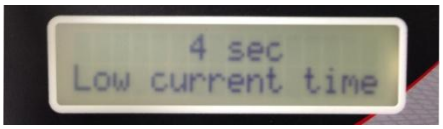
Low Current Threshold

To set this, monitor manual operation and when the vacuum store is full, take note of the mA value on the main screen (A) i.e. if the main screen shows 7078mA then this needs to be set at 72 x 100mA so that when the value drops below this the vacuum will turn off after the low current time.

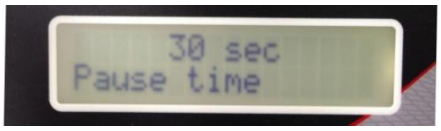
THIS IS ONLY AN EXAMPLE



Low Current Time
This should be set at 4s so when the mA value drops below the threshold for 4 seconds the vacuum stops.



Pause Time
This should be set at 30s and is the time between cycles of the vacuum (this is when the vacuum store drops its pellets into the main hopper).



Protection Time
This should be set at 5 mins so if the vacuum does not turn off after this time an alarm will show (this is usually due to lack of pellet, **Feeder Protection**).

Lower and Upper Sensors
Both these values should be set to NPN.

Protections
To ensure safe and failure free operation, the controller is equipped with a number of protections. When an alarm occurs the buzzer goes off and a corresponding message appears on the display.

Feeder Protection
Where the auxiliary hopper is not filled for a long period (e.g. due to lack of pellet) the controller will turn the feeder off and an alarm will be activated.

Fuse
The controller is equipped with a 10A fuse to protect the controller. **CAUTION**: this must be protected by a 13A fuse from a switched fused spur.

Maintenance
The pellet loader controller must be checked for any damage to its wires before and during the heating season. You should also check the mounting of the controller; clean it of dust and other contamination.

5.6.5 Technical Data

Specification	Unit	
Power Supply	V	230V 50Hz ±10%
Max Power Consumption	W	2000
Ambient Temperature	°C	5-50
Feeder Output	A	7
Feeder additional Output Load	A	1
Fuse Insert	A	10
Height	mm	600
Width	mm	400
Depth	mm	400
Weight	kg	25

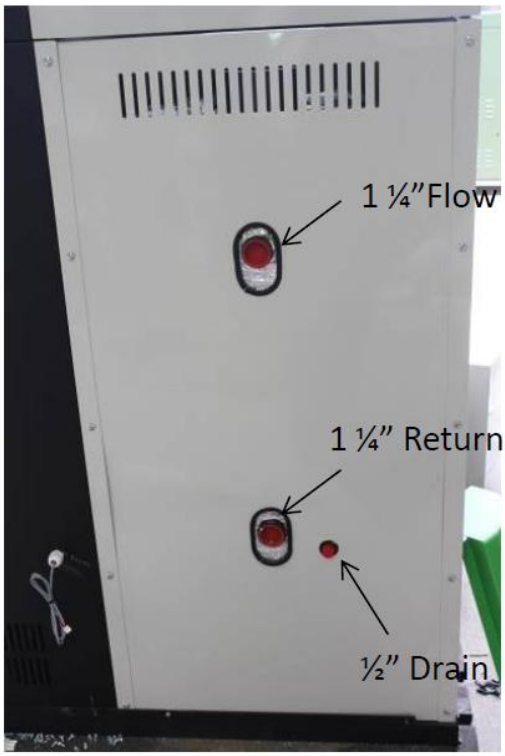
5.6.6 Assembly

NOTE: Installation should be performed by a fully qualified engineer. **DO NOT** install the unit with the power on (make sure that the plug is disconnected from the mains supply).
NOTE: Incorrect wiring may damage the controller.
The controller cannot be operated in a closed central heating system. The installation must include safety valves, pressure valves and a buffer tank to protect the boiler from water boiling in the central heating system.

THIS UNIT MUST NOT BE USED IN EXTERNAL CONDITIONS UNLESS THE BOILER IS SITED WITHIN A WATERPROOF BUILDING.

5.7 Water Connections

The diagram below indicates the plumbing connections at the rear of the boiler.



Incorrectly sized expansion vessels will invalidate the warranty. A minimum 18 litre vessel is recommended for the boiler plus additional expansion for the heating and domestic hot water system.

Ensure that the pre-charge in the vessel is equal to the initial system fill pressure of between 1-1.5 bar.

The boiler can be plumbed into either an open vented system (the maximum static head of water permissible is 90ft. (27.44 meters) or a sealed system. If plumbed into a sealed system an appropriately sized expansion vessel should be used and installed as per manufacturer's instructions. The expansion vessel should be sized based on the water capacity in the boiler and the water in the entire heating system.
The pump is on the return pipe work just before the boiler. It is recommended that a by-pass pipe between the flow and return is used with a valve to regulate the temperature of the water

returning to the boiler. Also, the system designer should ensure that there is adequate provision in the system for heat dissipation from the boiler during the shut-down/extinguishing phase. An automatic air vent and pressure relief valve must be fitted to the flow pipe work immediately outside the boiler. The pressure relief valve should be piped to a drain to prevent injury to the User or Service Technicians if it is activated. All unused connections should be sealed with blanking plugs. A non-return valve should be fitted to prevent back-siphonage.

Once the plumbing has been completed the system should be fully flushed to clear any debris which may have become lodged in the pipe work. The system should generally be filled from the lowest point on the system to force any air to the highest point where it can be vented. The flow pipe on the boiler is fitted with a manual air vent for venting air from the boiler.

The system must then be filled and the pump can be run continuously for a few hours to completely de-aerate the system. Hold the ESC button on the controller for 3 seconds to activate the pump. Repeat the procedure to turn it off. Only when the system has been fully vented can the boiler be commissioned.

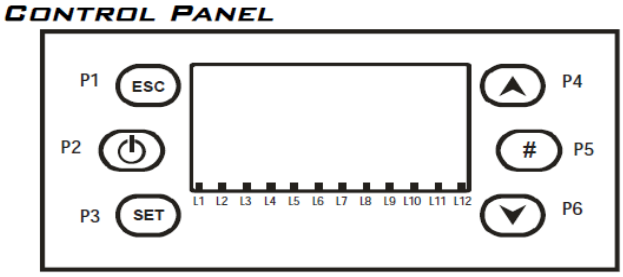
The installation and the design of the central heating system must be in accordance with BS EN 14336:2004: Heating Systems in Buildings. Installation and Commissioning of Water Based Heating Systems.

BS EN 12828:2003: Heating Systems in Buildings. Design of Water Based Heating Systems.

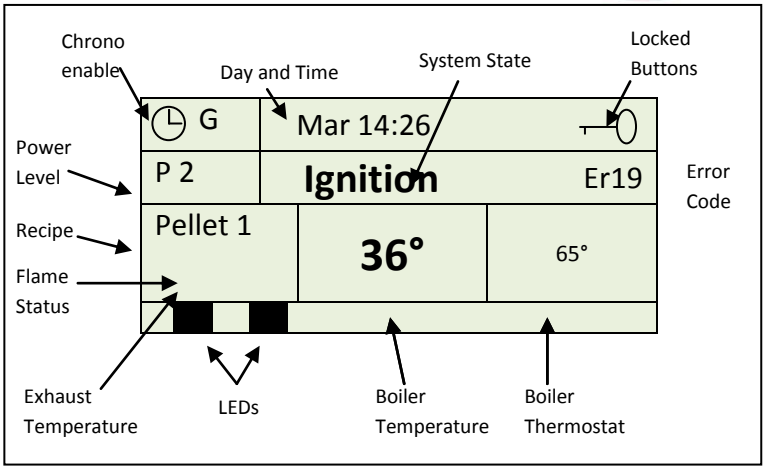
BS EN 12831:2003: Heating Systems in Buildings. Method for Calculation of the Design Heat Load.

Always ensure that all connections are making a watertight seal.

6. Control System



FUNCTION	DESCRIPTION	BUTTON
ON/OFF	Function: Ignition, extinguishing by pushing the button for 3 seconds until the acoustic signal.	P2
UNBLOCK	Function: Unblock. When the system is in block by pushing the button for 3 seconds until the acoustic signal.	
MODIFY VALUES INTO MENU	In modify change menu and submenu values.	P4 P6
RUN ON MENU AND SUBMENU	In menu run or submenu and menu.	
ESC	Function: Exit managed by pushing the button if in a menu or submenu. Out of menu "Pump Test".	P1
MENU	Function: Enter in menu or in a submenu.	P3
MODIFY	Enter in modify mode into a menu.	
SET	Save date in a menu.	
ENABLE CHRONO PROGRAMMING	In Chrono menu -> Chrono Program: enables the selected program.	P5
KEYBOARD KEYLOCK	To lock keyboard keys keep this button pressed for 3 seconds. To unlock repeat the same procedure.	

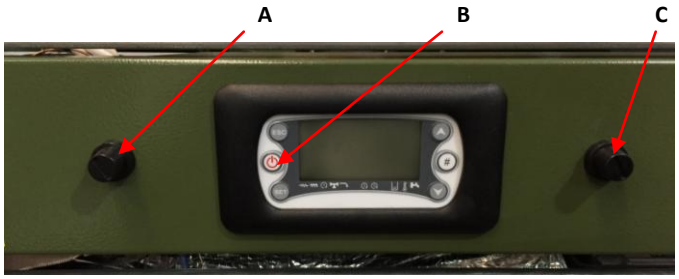


6.1 Error Codes

ERRORS	
DESCRIPTION	DISPLAY
Error Activation Thermostat High Voltage	Er01
Water Over-Temperature	Er04
Exhaust Over-Temperature	Er05
Water Pressure Low	Er09
Water Pressure High	Er10
Real Time Clock Error	Er11
Ignition Failed	Er12
Accidental Extinguishing for Lo Exhaust Temperature	Er13
Error Activation Pressure Switch (only with Exhaust Fan On)	Er14
Lack of Voltage	Er15
RS485 Communication Error	Er16
Extinguishing for Lack of Pellet	Er18
Lambda Regulator Error	Er22
Vacuum Error Below the Minimum Threshold	Er34
Vacuum Error Below the Maximum Threshold	Er35

In the unlikely event that the appliance fails to start or shuts down unexpectedly, then the error code shown on the display will give an indication as to the potential cause of the problem. Some of the errors can be cleared by the householder and they are:

Er01 – Water Safety Thermostat – Press the reset button A & C and then hold button B for 3 seconds to clear the error from the controller.



Er04 – Water Over-Temperature – Hold button B for 3 seconds. If the problem persists contact your service engineer.

Er05 – Exhaust Over-Temperature – Check that the baffles are in position and clean inside the combustion chamber.

Er09 – Low Water Pressure – Contact your installer.

Er12 – Failed Ignition – Empty any un-burnt pellets from the burner pot and hold button B for 3 seconds to clear the error.

Er13 – Accidental Extinguishing for Low Exhaust Temperature – Empty any un-burnt pellets from the burner pot and hold button B for three seconds.

Er15 – Loss of Voltage – Usually occurs after a power cut. Empty any un-burnt pellet from the burner pot and hold button B for 3

seconds. Turn off the time clock for 10 seconds before switching on again.
Er18 – Lack of Pellet – When the pellets reach the pellet sensor in the hopper the system extinguishes to prevent having to re-prime the auger. Refill the hopper and hold button B for 3 seconds. Turn off the time clock for 10 seconds before switching on again.
Er34 – Low Vacuum Pressure – Clear the error by holding button B for 3 seconds. Turn off the time clock for 10 seconds before switching on again.
Er35 – High Vacuum Pressure – Clear the error by holding button B for 3 seconds. Turn off the time clock for 10 seconds before switching on again.

7. Boiler Operation & Maintenance

The Greenflame 40kW has been developed to ensure that the user is able to carry out the most basic function in a safe and convenient manner. Once the installation has been successfully carried out the user interaction is quiet simple from a regular inspection on the combustion chamber to remove ash to filling the hopper with pellets.

7.1 Turning ON and OFF the Boiler

- It is recommended that your boiler is controlled by an external time clock. The time programs should be set to the times that heat is required at different periods throughout the day. You should also make allowance for the ignition of the appliance, i.e. the time it takes from when the time clock signals the boiler to start until the flame has fully developed in the appliance (usually approx. 10-20 minutes).
- When choosing your programs on your time clock it is recommended that you program the clock for long runs instead of short runs. This gives the boiler time to settle and match the heat demand of the property. It is also when the boiler is most efficient.
- If the boiler is not being controlled by a time clock then it can be turned on and off locally at the display on the boiler control panel. Hold the ON/OFF button for 3 seconds to start the boiler. Hold the ON/OFF button for 3 seconds to turn off the boiler.

7.2 Emptying the Ash pan

The primary ash pan is located in the main combustion chamber. The frequency of emptying the ash pan is determined by the length of time the boiler has been running and under what load conditions. Once the ash in the ash pan has reached the top then it should be emptied. A daily check during the first few days of operation will give an indication as to when it needs to be emptied.

Always make sure that before you open the main combustion chamber door that the boiler has been switched off and has been allowed to cool down sufficiently so as not to cause injury.

Always empty ash into a metal container as ash which may appear cool could be hot in the centre.

Never use plastic brushes or dust pans to clean ash from the boiler.
Always use heat resistant gloves when handling the ash pan or cleaning the boiler.
When the combustion chamber door is opened, with the boiler in the OFF position, the combustion fan will run at full power.

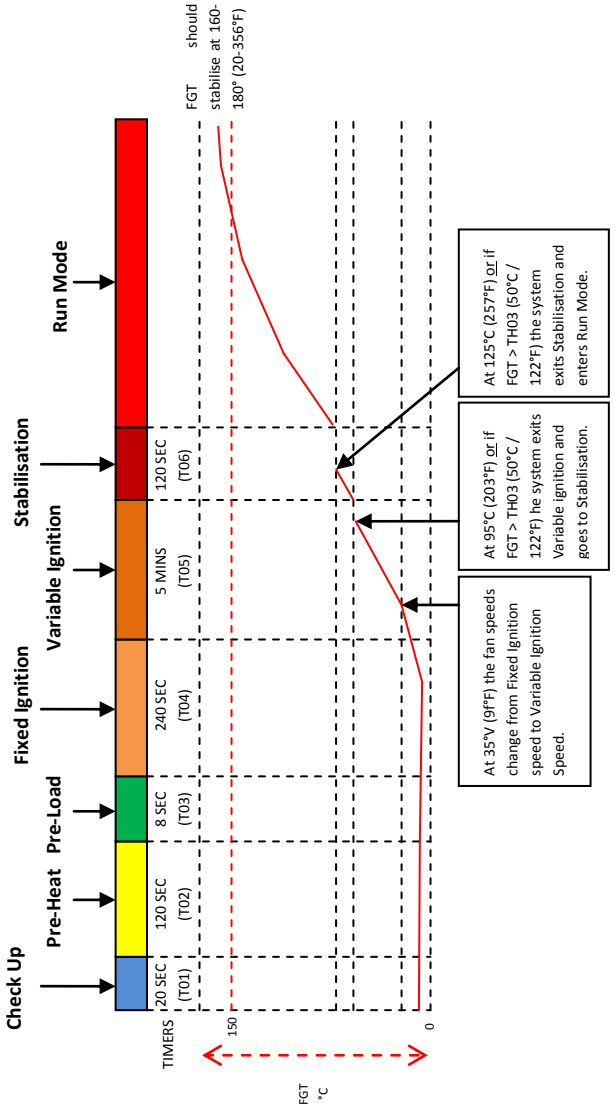
7.3 Filling the Hopper with Fuel

- The boiler will indicate when the level of pellets reaches a low level. The system will shut down and will wait for the hopper to be refilled.
- Open the pellet hopper lid and carefully pour approved pellets into the hopper.
- Never fill the hopper above the guard mesh across the opening of the hopper.

Never allow any foreign material to enter the hopper. This will lead to the malfunction of the auger system and could damage to the appliance and invalidate your warranty.
Always close the lid to the hopper once it has been filled with pellets.
Never leave the hopper lid open for prolonged periods as rain or moisture can affect the pellet.
Always supervise children when the hopper lid is open in case foreign material is placed into the hopper or children climb into the hopper.

7.4 First Fire-Up

Hold the ON/OFF key (P2) for 3 seconds until 'Ignition Started' appears on the display. The system will go through each stage for the specified time as per the graph below. The various stages can be observed from the main screen and other information is available through the monitor screens.

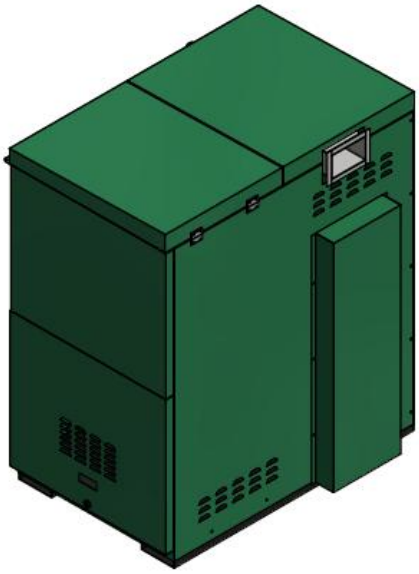

FGT should stabilise at 160-180° (20-356°F)
Run Mode
Stabilisation
Variable Ignition
Fixed Ignition
Pre-Load
Pre-Heat
Check Up
120 SEC (T06)
5 MINS (T05)
240 SEC (T04)
8 SEC (T03)
120 SEC (T02)
120 SEC (T01)
TIMERS
150
0
FGT °C
At 125°C (257°F) or if FGT > TH03 (50°C / 122°F) the system exits Stabilisation and enters Run Mode.
At 95°C (203°F) or if FGT > TH03 (50°C / 122°F) he system exits Variable Ignition and goes to Stabilisation.
At 35°V (9F°F) the fan speeds change from Fixed Ignition speed to Variable Ignition Speed.

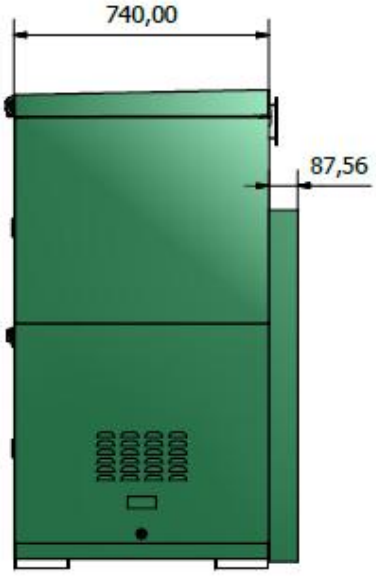
As the water temperature in the boiler nears its set point the system should start to modulate down through the power levels. Once the target temperature has been reached the system will enter the Extinguishing stage, Final Cleaning and then rest in Standby until the water temperature drops by 3°C.
It is recommended that a flue gas analysis is carried out to obtain a nominal 12% CO^2 at Power level 7 and down to 8-10% CO^2 at Power level 1. This will ensure a consistent level of combustion and any air adjustments can be made through the Combustion Fan menu by adjusting the power level fan speed.

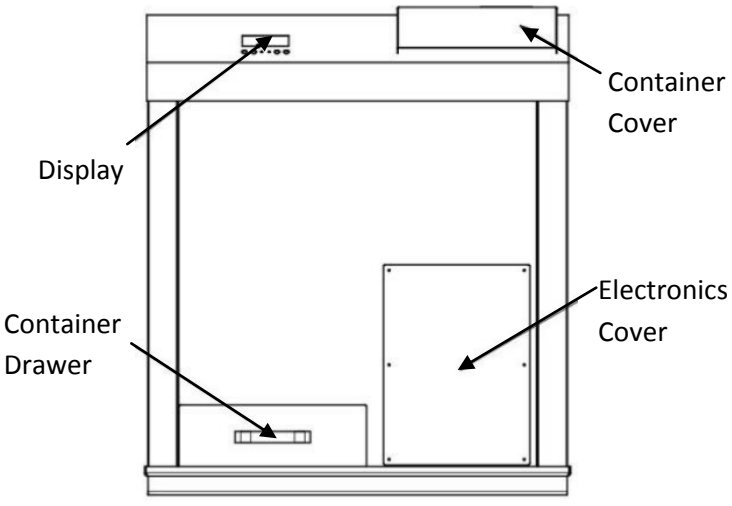
8. Technical Data

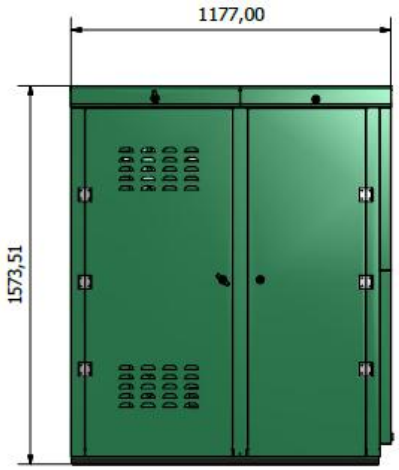
Boiler Model	Greenflame 40	
Nominal (Max) Rated Output	kW	40
Reduced Rated Output (30%)	kW	12
Boiler Class	Class	5
Efficiency at nominal Output	%	94
Test Standard		EN303-5:1999
Water Capacity – litres	litres	76
Waterside Resistance – mbar	mbar	35
Operating Temperature Range	°C	60-85
Recommended Return Temperature		60
Maximum Operating Pressure	bar	2
Flue Gat Temperature at Maximum Rated Output	°C	175
Flue Gas Temperature at Reduced Rated Output	°C	110
Flue Outlet Diameter	mm	146
Recommended Flue Diameter	mm	150
Flue Draught Required at Reduced Output	Pa	10/25
Flue Draught Required at Nominal Output	Pa	25
Fuel		6mm Wood Pellets
Fuel Standard		ENplus-A1
Water Flow Connection	Inch	1 ¼" (DN 65)
Water Return Connection	Inch	1 ¼" (DN 65)
Water Drain Connection	Inch	1" (DN 25)
Safety Valve/Air Vent Connection	inch	½" (DN 15)
Electrical Supply		230V 50Hz 0.6A
Current at Start-Up	A	2.5A
Auxiliary Power at Reduced/Nominal	watts	132-417w
Standby Power	watts	6.7w
Total Dry Weight	kg	375kg

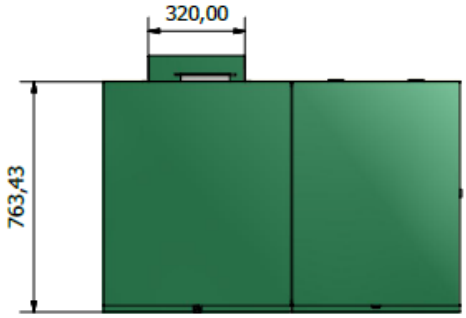
Full door access to the front side of the boiler



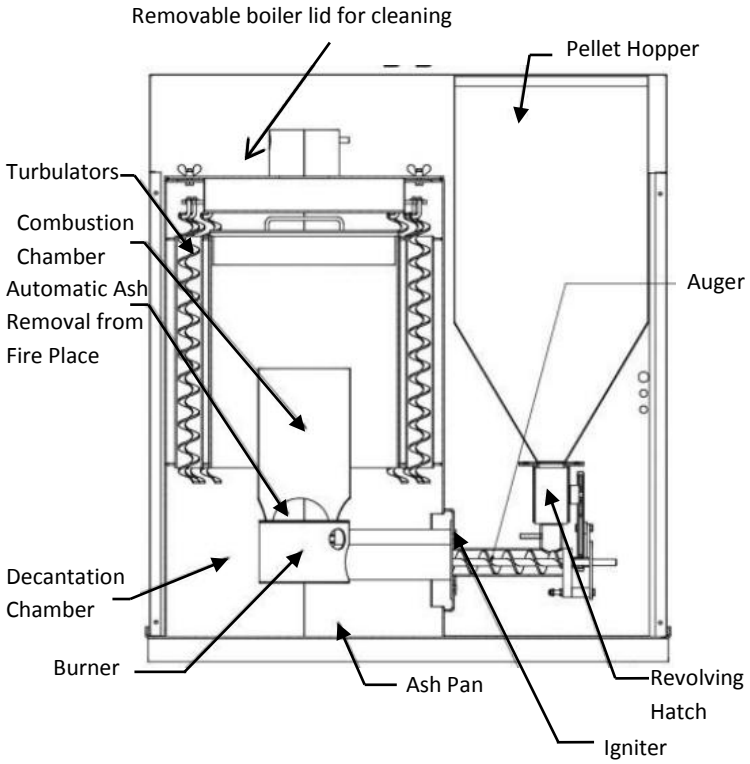


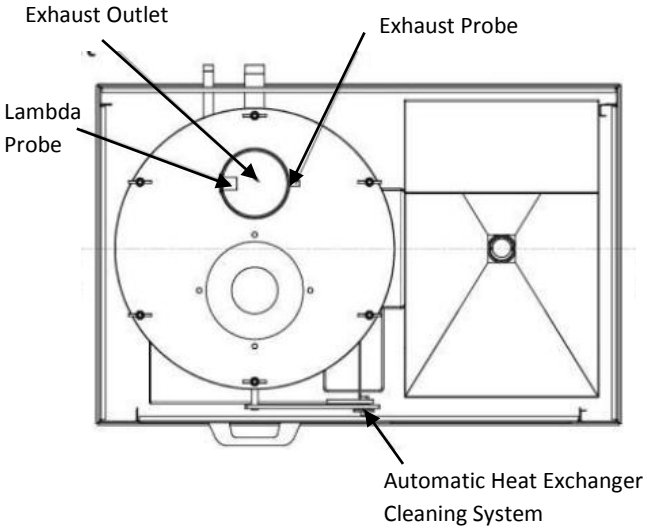






Boiler Internal Construction





9. Maintenance Schedule

Ensure that your Greenflame wood pellet boiler appliance is at its highest efficiency and trouble free operation it is essential that the following maintenance schedule is adhered to by a **QUALIFIED SERVICE ENGINEER:-**

- **Full System Service** – by Service Provider – Every 12 months or 1200 running hours, whichever comes first (recommended just before the heating season i.e. October).
- **Heat Exchanger Clean** – by Service Provider – 6 months after a full service (recommended March after winter season).
- **Emptying of Ash Containers** – by Operator – Weekly
- **Clean Down of Boiler Services** – by Operator – every 2 weeks.

Full Service

- Remove baffles from main combustion chamber and clean down all heat exchanger surfaces.
- Remove turbulator cleaning mechanism from the boiler and clean heat exchanger tubes.
- Empty ash containers.
- Remove exhaust fan motor and clean flue gas passage ways to the flue outlet.
- Remove and clean the flue gas thermocouple.
- Remove the fans and check for dust. Never touch the wires and only clean with an air blow.
- Completely clean the flue through the inspection door.
- Remove the burner pot and remove any loose ash in the pot holder.
- Ensure all air-holes in the burner pot are clear and check the rope seal that it maintains a seal when replaced in the holder.
- Replace the ignitor and adjust accordingly.
- Check sealing rope and tape on the lower ash pan door and main combustion door that it maintains a good seal. Replace if necessary.
- Check the ceramic board on the combustion chamber door and replace if necessary.
- Disconnect and remove the auger motor.
- Remove the auger and clean out any debris. Refill with fuel and re-prime the auger.
- Check auger calibration.
- Check all outputs tests (as per commissioning guide).

Heat Exchanger Clean

- Remove and empty both ash containers.
- Remove baffles and completely clean down heat exchanger surfaces.
- Remove the burner pot and remove any loose ash in the pot holder.
- Remove turbulator cleaning mechanism from the boiler and clean heat exchanger tubes.
- Ensure all the air-holes in the burner pot are clear and check the rope seal that it maintains a seal when replaced in the holder.
- Check sealing tape and rope on the lower ash pan door and main combustion chamber door respectively and check that it maintains a good seal. Replace if necessary.

Emptying of Ash Containers and Clean Down of Boiler Surfaces

- Remove and empty the main ash container every week or more frequently if required.
- Clean down boiler surfaces when emptying main ash container.
- Remove and empty the secondary ash container every 2 weeks or more frequently if required. Ensure that the secondary ash pan door is fully secured and air tight.

10. Service Log

Date	**Service Provided**	**Service Engineer**
Date	**Service Provided**	**Service Engineer**
Date	**Service Provided**	**Service Engineer**
Date	**Service Provided**	**Service Engineer**
Date	**Service Provided**	**Service Engineer**
Date	**Service Provided**	**Service Engineer**
Date	**Service Provided**	**Service Engineer**
Date	**Service Provided**	**Service Engineer**

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400009 January 2015